

## ABSTRACT

Methods and systems consistent with this invention identify a buried object using array-based ground penetrating radar having a control device, a plurality of transmit antennas, and a plurality of receive antennas. Such methods and systems receive a transmit timing input signal and a receive timing input signal. Such methods and systems comprise a first delay circuit for receiving the transmit timing input signal and generating a number of intermediate transmit timing signals delayed with respect to each other by a delay time, and transmit output switch circuit to select either the transmit timing input signal or a corresponding one of the intermediate transmit timing signals as a corresponding output transmit timing signal. Such methods and systems also comprise a second delay circuit for receiving the receive timing input signal and generating a number of intermediate receive timing signals delayed with respect to each other by the delay time, a shift-delay circuit coupled to the second delay circuit and the receive timing input signal to add the delay time to the intermediate receive timing signals, and a receive output switch circuit to select either the receive timing input signal or a corresponding one of the intermediate receive timing signals as a corresponding output receive timing signal. Such methods and systems also comprise an antenna array comprising a plurality of transmit antennas, a plurality of receive antennas, and means for selectively enabling the transmit and receive antennas to allow each of the receive antennas to receive energy from any one of the transmit antennas.